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Quality of Life and its Association with Geriatric Syndromes Amongst Older Adults Living in the Community in Central Mahalapye Sub-District, Botswana

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Abstract

The study assessed the quality-of-life (QOL) and its relationship with sociodemographic factors and geriatric syndromes among older adults residing in Botswana's Central Mahalapye subdistrict. This was a cross-sectional study. To assess geriatric syndromes, the survey used the brief-assessment-tool-for-comprehensive-geriatric-assessment (BAT for CGA), as well as the World Health Organisation Quality-of-Life-Questionnaire-Short-Version (WHOQOL-BREF) to assess the QOL domains. We used a multivariate linear regression model to find out how external factors, like geriatric syndromes and sociodemographic factors, affect the QOL score across different domains. The study encompassed a grand total of 414 older adult individuals. Except for the physical domain of the WHOQOL-BREF, senior participants in this study reported a high QOL, as most average scores across multiple domains of the WHOQOL-BREF exceeded 50%. Frailty impacted negatively in self-perception of QOL, self-perception of health, and WHOQOL-BREF social and environmental domains (β=-.124, t=-2.543, p=.011, β=-.258, t=-4.991, p=<.001, β=-.190, t=-4.198, p=<.001, β=-.170, t=-3136, p=.002, and β=-.147, t=-3.129, p=.002, respectively). While osteoporosis impacted negatively on self-perception of QOL, self-perception of health, WHOQOL-BREF psychological, social, and environmental domains (β=-.104, t=-2.426, p=.016, β=-.117, t=-2.378, p=.008, β=-.211, t=-4.916, p=<.001, β=-.137, t=-2.934, p=.004, and β=-.287, t=-6.437, p=<.001, respectively). High education level had a positive impact on self-perception of QOL (β=.165, t=3.566, p<.001), and living with a partner impacted positively on self-perception of QOL (β=.216, t=5.196, p<.001) and self-perception of health (β=.167, t=3.488, p<.001). We suggest that more research be done to make sure that the BAT for CGA tool works correctly in rural Africa.

Keywords: *Botswana, Geriatric Syndromes, Older Adults, Quality of Life, WHO-BREF.*

Introduction

The social and economic progress that the world experiences today directly influence life expectancy enhancement. Currently, 10% of the world's population is 60 or older, and we expect this proportion to double by 2050 [1]. With the aging population increasing, it is necessary to examine the way in which this demographic lives.

According to the World Health Organization Quality of Life (WHOQOL) Group, quality of life refers to an individual's perception of their position in life within their culture and value systems, as well as their goals, expectations, standards, and concerns [2]. The WHOQOL-BREF is a questionnaire that assesses four categories of quality of life: physical health, psychological well-being, social connections, and environment. It also includes one element

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that measures the overall quality of life (QOL) and general health [2, 3].

In numerous older adult populations, geriatric syndromes, which are a collection of multifactorial health conditions, have been associated with a diminished QOL [4]. Common geriatric syndromes in primary healthcare encompass a range of conditions, including declined functionality (activity of daily living [ADL] and instrumental activity of daily living [IADL], impaired balance, gait, falls, polypharmacy, osteoporosis, and frailty), nutritional risk to malnutrition, diminished sensory perception (including visual and hearing impairments, and urinary incontinence), and mental disorders such as cognitive decline and depression [5].

However, the absence of medical conditions or geriatric syndromes does not exclusively dictate the QOL. Other common factors include chronic illnesses, physical limitations, psychological and social challenges, and depression symptoms. Attending to these concerns is crucial for ageing successfully, as they have the potential to disrupt one's QOL [4, 6, 7]. A decline in QOL among older adults is associated with adverse health consequences, including mortality and injuries.

Geriatric syndromes have negative impact on QOL. As part of their community-based randomized controlled trial, Tasioudi discovered statistically significant differences in four parts of the WHOQOL-BREF questionnaire, considering participants age, level of education, frailty, cognitive impairment, or activities of daily living (ADL) [8].

Most studies investigating QOL in older adults and its correlation with demographic traits and geriatric conditions have concentrated on hospitalised or institutionalised individuals [9], and are from developed countries [8]. The African region has limited data, primarily derived from community-based studies.

To promote successful ageing, healthcare providers and policymakers have prioritised the enhancement and preservation of QOL throughout the later stages of life. Nevertheless, increased longevity does not ensure a contented old age, as deteriorating health typically results in a decline in QOL [4].

The study assessed the QOL of older adults residing in Botswana's Central Mahalapye subdistrict. It assessed whether QOL was linked to certain demographic and geriatric syndromes. Based on previous research, we hypothesise that the substantial prevalence of GS, some sociodemographic factors, and geriatric syndromes could have a significant impact on the WHOQOL-BREF score [10]. The null hypotheses are (i) the sociodemographic factors and geriatric syndromes have no impact on older individuals' self-perception of QOL score in the Central Mahalapye sub-district (hypothesis 1[H1]), and (ii) the sociodemographic factors and geriatric syndromes have no impact on older individuals' self-perception of health score in the Central Mahalapye sub-district (hypothesis 2 [H2]). And (iii) the geriatric syndromes and sociodemographic factors don't change the WHOQOL-BREF physical (hypothesis 3a [H3-a]), psychological (hypothesis 3b [H3-b]), social (hypothesis 3c [H3-c]), and environmental (hypothesis 3d [H3-d]) domain scores of older people in the Central Mahalapye sub-district.

Materials and Methods

Study Site, Design, and Period

This study was undertaken as part of a cross-sectional quantitative study to assess the prevalence of geriatric syndromes and quality of life in older adults living in the community in the Central Mahalapye Sub-District, Botswana. The survey took place between April 2022 and January 2024. Over 35 villages and localities make up the Central Mahalapye sub-district. According to the 2011 Botswana National Census, the Central Mahalapye sub-district has 118,875 residents, of whom 7846 were 65 or older [11]. Batswana Old adults are

required to register with the Botswana Pension Office in order to receive a monthly pension amount of BWP 830.00 (USD 50) [12]. The University of Botswana Family Medicine Department trains at Mahalapye District Hospital (MDH).

Study Population, and Sample Size

The study included Batswana older adults from the Central Mahalapye sub-district. We calculated the sample size using the formula:

$$n' = \frac{NZ^2P(1-P)}{d^2(N-1)+Z^2P(1-P)},$$

where n' is the sample size with finite population correction, N is the population size (7846), Z is the statistic level of confidence (1.96), P is the expected proportion (50% as unknown), and d is the precision (5%). We increased the sample size by 10% to account for non-responders [13]. Therefore, the study selected at least 402 older adults from the community.

Inclusion, and Exclusion Criteria

At least six months of residence in the Central Mahalapye subdistrict and 65 years of age were requirements for inclusion in the study. We excluded individuals who were not Botswana citizens, those hospitalised for a minimum of three months prior to the research period, and those not eligible for benefits from the Botswana Pension Office.

Subject Recruitment

We have obtained the roster of elderly individuals from the Botswana Pension Office. We conducted recruitment in the three main villages as follows: From the Botswana Pension Office's list, we recruited 160 older adults from Mahalapye, 60 from Shoshong, and 40 from Sefhare. To enrol individuals from these villages, research assistants (including University of Botswana family medicine residents and medical students on rotation in family medicine) employed a systematic random selection method. They chose every fourth household in Mahalapye (46418/11997), Shoshong (11894/3104), and Sefhare (5295/1297) based on the Google village map [14], starting from a blind spot.

Also, we used Microsoft Excel to randomly choose 150 elderly individuals from the Botswana Pension Office's roster. To do this, we used Microsoft Excel to randomly choose 15 individuals from each of the 10 research villages (also randomly selected). The chosen villages were Bonwapitse, Chadibe, Kudumetse, Machaneng, Matlako, Mmutlana, Mookane, Ngwapa, Taupye, and Poloka.

Data Collection and Analysis

This study's data collection tool, which was based on the "Prevalence of Geriatric Syndromes and Quality of Life in Older Adults in the Community in the Central Mahalapye Sub-District, Botswana" survey, consisted of three components: (i) sociodemographic data; (ii) BAT for CGA [5]; and (iii) an evaluation of quality of life (QOL) utilising the World Health Organisation Quality-of-Life-Questionnaire-Short-Version (WHOQOL-BREF) [15].

The WHOQoL-BREF consists of two items that assess an individual's self-perception of quality of life and self-perception of health. Additionally, there is a 24-item questionnaire that evaluates physical health, psychological domain, social domain, and environmental domain [15].

We utilised a 5-point Likert scale to evaluate the responses. When an item was absent, the meaning of the remaining items in the domain was used to fill the void. A domain score was discarded if more than two items were missing from the domain. We converted questions 1 and 2 to 100% were made by multiplying each score by 5. We used the table for converting raw scores to transformed scores to calculate the transformed score for each domain (out of 100) [15, 16].

Although a continuous scale for QOL was used for analysis, participants were categorised in low QOL group when the score in the

particular domain was ≤ 49%, and high QoL when the score in the particular domain was ≥ 50% [17].

We summarised information as frequency, mean (±s.d.), or median (± IQR) and tables where appropriate to describe socio-demographic information, geriatric syndromes, and QOL.

The internal consistency of the WHOQOL-BREF scores was satisfactory, as evidenced by the Cronbach alpha value of 0.8.

We used a multivariate linear regression model to find out how external factors, like geriatric syndromes and sociodemographic factors, affect the QOL score across different domains. We employed a stepwise approach to evaluating hypotheses. We analysed the data using IBM SPSS version 29.0.0.0 (241). We established the significance level at less than 0.05. Additionally, the Variance inflation factor (VIF) value of 1 suggested a lack of correlation between the independent variables. A VIF value ranging from 1 to 5 suggests a moderate correlation between the variables. When the VIF falls between 5 and 10, it suggests that there is multicollinearity among the predictors in the regression model. On the other hand, VIF values greater than 10 indicate that the estimation of regression coefficients is insufficient due to multicollinearity [18].

Validity and Reliability

Family medicine residents and medical students (research assistants) from the University of Botswana conduct the routine assessment of older adults in Mahalapye village. They are already acquainted with the BAT for CGA tool, so there was no need to evaluate its user-friendliness for the form.

Ethical Considerations

The researcher followed the Helsinki Declaration. The Botswana Ministry of Health and Wellness' Health Research and Development Division (HPDME: 13/18/1), the University of Botswana's Research Committee (UBR/RES/IRB/BIO/GRAD/284), and the Mahalapye Health District Ethical Committee (MH/DHMT/1/7/7 [43]) gave ethical approval.

Results

The study encompassed a grand total of 414 older adult individuals. Table 1 displays the sociodemographic characteristics of participants in the study. Table 2 shows the frequency of geriatric syndromes for each age group among older persons who participated in this study.

Table 1. Sociodemographic Characteristics of Participants, Older Adults Living in Community in the Central Mahalapye Sub-District Study

Characteristics of participants	**Sex**		**Total**		
	Male	***Female***	***n***	***%***	***95% CI***
	n=150 (36.2)	***n=264 (63.8)***			
Age group n (%)					
65–74 years	79 (52.7)	159 (60.2)	238	57.5	52.4–62.6
75–79 years	37 (24.7)	36 (13.6)	73	17.6	14.3–21.5
80–84 years	20 (13.3)	42 (15.9)	62	15.0	11.4–18.6
≥ 85 years	14 (9.3)	27 (10.2)	41	9.9	7.2–12.8
Living arrangement n (%)					
Living without partner	43 (28.7)	199 (75.4)	242	58.5	53.9–63.3
Living with partner	107 (71.3)	65 (24.6)	172	41.5	36.7–46.1

Level of education n (%)					
Non-formal education	84 (56.0)	142 (53.8)	226	54.6	50.0–59.2
Primary	48 (32.0)	102 (38.6)	150	36.2	31.6–40.8
Secondary	13 (8.7)	15 (5.7)	28	6.8	4.4–9.2
Tertiary	5 (3.3)	5 (1.9)	10	2.4	1.2–3.9

Table 2. Frequency of Geriatric Syndromes Among older Adults Living in Community in the Central Mahalapye Sub-District Study

Geriatric syndromes		**Total**	
		Number	***Percentage***
ADL[a] impairment	No	391	94.4
	Yes	23	5.6
IADL[b] impairment	No	86	20.8
	Yes	328	79.2
Nutrition risk	No	153	37.0
	Yes	261	63.0
Visual impairment	No	169	40.8
	Yes	245	59.2
Hearing impairment	No	287	69.3
	Yes	127	30.7
Urine incontinence	No	237	57.2
	Yes	177	42.8
Fall	No	297	71.7
	Yes	117	28.3
Frailty	No	219	52.9
	Yes	195	47.1
Polypharmacy	No	346	83.6
	Yes	68	16.4
Osteoporosis	No	336	81.2
	Yes	78	18.8
Cognitive impairment	No	343	82.9
	Yes	71	17.1
Mood disorder/depression	No	177	42.8
	Yes	237	57.2

[a.] activity of daily living; [b.] instrumental activity of daily living.

Table 3 demonstrates that, when examining the scores for each QOL domain, except for the physical domain of WHOQOL-BREF which was perceived as low (mean score= 44%, SD=19%), older adults scored high in their perception of QOL and the environmental domain of WHOQOL-BREF (mean score=60%, SD=18%, and mean score=.59%, SD .24%, respectively). Furthermore, their scores in the psychological and social areas were high, with a mean score of 55% with a standard deviation of 16% in the psychological domain and a mean score of 57% with a standard deviation of 20% in the social domain.

Table 3. World Health Organisation Quality-of-Life-Questionnaire-Short-Version Scores Means among Older Adults Living in Community in the Central Mahalapye Sub-District Study

	Mean	**Standard Deviation**	**Perception of QOL in the domain**
WHOQOL-BREF[a] self-perception of QOL[b]	.60	.23	High
WHOQOL-BREF[a] self-perception of health	.56	.23	High
WHOQOL-BREF[a] physical domain	.44	.19	Low
WHOQOL-BREF[a] psychological domain	.55	.16	High
WHOQOL-BREF[a] social domain	.57	.20	High
WHOQOL-BREF[a] environmental domain	.60	.18	High

[a.]World Health Organisation Quality-of-Life-Questionnaire-Short-Version; [b.]quality of life.

Table 4 shows the multivariate logistic regression analysis of relationship between sociodemographic, geriatric syndromes variables and WHOQOL-BREF scores. The analysis of the older adults' self-perception of QOL (dependent variable) showed a significant model summary: F (9, 403) = 23.752, p<.001, which indicated that the nine factors understudy (frailty, education level, living arrangement, nutrition risk, hearing impairment, urinary incontinence, age group, mood disorder/depression, and osteoporosis) had a significant impact on how participants rated their QOL. Moreover, the adjusted R^2=.332 depicted that the model explains 33.2% of variance in how participants rated their QOL. Additionally, coefficients were further assessed to ascertain the influence of each of the factors on older adults' self-perception of QOL variable. For instance, the results revealed that frailty, nutrition risk, hearing impairment, urinary incontinence, mood disorder/depression and osteoporosis had a significant and negative impact on older adults' self-perception of QOL (β=-.124, t=-2.543, p=.011, β=-.150, t=-3.375, p=.<.001, β=-.235, t=-5.235, p<.001, β=-.131, t=-2.941, p=.003, β=-.111, t=-2.427, p=.0163, and β=-.104, t=-2.426, p=.016, respectively). While age group, education level and living arrangement had a significant and positive impact on older adults' self-perception of QOL (β=.120, t=2.675, p=.008, β=.165, t=3.566, p<.001, and β=.216, t=5.196, p<.001, respectively). Hence, H1 was supported. The results of the VIF showed moderate correlation of variables in the dataset as VIF were between 1.068 and 1.476.

Table 4. Multivariate Logistic Regression Analysis of Relationship Between Sociodemographic, Geriatric Syndromes Variables and World Health Organisation Quality-of-Life-Questionnaire-Short-Version Scores, in Older Adults Living in Community in Central Mahalapye Sub-District Study

Hypotheses	**Regression Weights**		**Beta**	**t-value**		***p*-value**	**Results**	**VIF[j]**
	Independent variables	**Dependent variables**						
H1[a]	Frailty	WHOQOL-BREF[i] self-perception of QOL[h]	-.124	-2.543		.011	Supported	1.476
	Education level		.165	3.566		<.001	Supported	1.322
	Living arrangement		.216	5.196		<.001	Supported	1.068
	Nutrition risk		-.150	-3.375		<.001	Supported	1.216

	Hearing impairment		-.235	-5.235		<.001	Supported	1.240
	Urinary incontinence		-.131	-2.941		.003	Supported	1.215
	Age group		.120	2.657		.008	Supported	1.258
	Mood disorder/depression		-.111	-2.427		.016	Supported	1.301
	Osteoporosis		-.104	-2.426		.016	Supported	1.140
	F (11, 401) =24.814 *p*<.001. Adjusted R^2= .389							
H2[b]	Frailty	WHOQOL-BREF[i] self-perception of health	-.258	-4.991		<.001	Supported	1.540
	Fall		-.115	-2.324		.021	Supported	1.411
	Osteoporosis		-.117	-2.678		.008	Supported	1.112
	Urinary incontinence		-.124	-2.718		.007	Supported	1.200
	Age group		-.094	-2.178		.030	Supported	1.069
	Gender		.185	3.849		<.001	Supported	1.336
	Living arrangement		.167	3.488		<.001	Supported	1.330
	Mood disorder/depression		-.095	-2.051		.041	Supported	1.235
	F (8, 404) =21.780 *p*<.001. Adjusted R^2= .287							
H3-a[c]	Frailty	WHOQOL-BREF[i] physical domain	-.190	-4.198		<.001	Supported	1.327
	Hearing impairment		-.249	-5.753		<.001	Supported	1.217
	Fall		-.273	-5.797		<.001	Supported	1.442
	ADL [g]		-.209	-5.172		<.001	Supported	1.063
	Nutrition risk		-.128	-3.037		.003	Supported	1.155
	Age group		-.112	-2.494		.013	Supported	1.300
	Cognitive impairment		.092	2.264		.024	Supported	1.078
	F (7, 405) =35.060 *p*<.001. Adjusted R^2= .367							
H3-b[d]	Urine incontinence	WHOQOL-BREF[i] psychological domain	-.284	-6.349		<.001	Supported	1.082
	Education level		.200	4.476		<.001	Supported	1.087
	Osteoporosis		-.211	-4.916		<.001	Supported	1.003
	Hearing impairment		-.196	-4.506		<.001	Supported	1.030
	ADL [g]		.141	3.237		.001	Supported	1.034
	F (5, 407) =27.048 p<.001 Adjusted R^2= .240							
H3-c[e]	Urinary incontinence	WHOQOL-BREF[i] social domain	-.312	-6.458		<.001	Supported	1.187
	Osteoporosis		-.137	-2.934		.004	Supported	1.106
	Mood disorder		-.124	-2.553		.011	Supported	1.209
	Fall		.207	3.962		<.001	Supported	1.395
	Frailty		-.170	-3.136		.002	Supported	1.489

	Hearing impairment		.122	2.697		.007	Supported	1.039
	Visual impairment		.100	2.236		.026	Supported	1.016
	F (6, 405) =16.939 p<.001 Adjusted R^2= .184							
H3-d[f]	Frailty	WHOQOL-BREF[i] environmental domain	-.147	-3.129		.002	Supported	1.256
	Living arrangement		.243	5.604		<.001	Supported	1.080
	Osteoporosis		-.287	-6.437		<.001	Supported	1.135
	Hearing impairment		-.167	-3.932		<.001	Supported	1.034
	Mood disorder/ depression		-.184	-4.094		<.001	Supported	1.153
	Cognitive impairment		.115	2.580		.010	Supported	1.129
	F (6, 406) =27.665 *p*<.001 Adjusted R^2= .280							

[a] hypothesis 1;[b] hypothesis 2;[c] hypothesis 3a; [d] hypothesis 3b;[e] hypothesis 3b;[f] hypothesis 3d; [g] activity of daily living; [h] quality of life; [i] World Health Organisation Quality-of-Life-Questionnaire-Short-Version; [j] variance inflation factor.

The analysis of the older adults' self-perception of health (dependent variable) showed a significant model summary: *F* (8, 404) = 21.780, p<.001, which indicated that the eight factors understudy (frailty, fall, osteoporosis, urinary incontinence, age group, gender, living arrangement, and mood disorder/depression) had a significant impact on how participants rated their health. Moreover, the adjusted R^2=.287 depicted that the model explains 28.7% of variance in how participants rated their health. Additionally, coefficients were further assessed to ascertain the influence of each of the factors on older adults' self-perception of health variable. For instance, the results revealed that frailty, fall, osteoporosis, urinary incontinence, age group, and mood disorder/depression had a significant and negative impact on older adults' self-perception of health (β=-.258, t=-4.991, p=<.001, β=-.115, t=-2.324, p=.021, β=-.117, t=-2.378, p=.008, β=-.124, t=-2.718, p=.007, β=-.094, t=-2.178, p=.030, and β=-.095, t=-2.051, p=.014, respectively). While gender (male) and living arrangement had a significant and positive impact on older adults' self-perception of health (β=.185, t=3.849, p<.001, and β=.167, t=3.488, p<.001, respectively). Hence, H2 was supported. The results of the VIF showed moderate correlation of variables in the dataset as VIF were between 1.069 and 1.540.

The analysis of the WHOQOL-BREF physical domain (dependent variable) showed a significant model summary: *F* (7, 405) = 35.060, p<.001, which indicated that the seven factors understudy (frailty, hearing impairment, fall, ADL, nutrition risk, age group, and cognitive impairment) had a significant impact on how participants rated their health. Moreover, the adjusted R^2=.367 depicted that the model explains 36.7% of variance in how participants rated their QOL. Additionally, coefficients were further assessed to ascertain the influence of each of the factors on WHOQOL-BREF physical domain variable. For instance, the results revealed that frailty, hearing impairment, fall, ADL, nutrition risk, and age group had a significant and negative impact on WHOQOL-BREF physical domain score (β=-.190, t=-4.198, p=<.001, β=-.249, t=-5.753, p=<.001, β=-.273, t=-5.797, p=<.001, β=-.209, t=-5.172, p=<.001, β=-.128, t=-3.037, p=.003, and β=-.112, t=-2.494, p=.013, respectively). Hence, H3-a was supported. The results of the VIF showed moderate correlation of variables in the dataset as VIF were between 1.063 and 1.442.

The analysis of the WHOQOL-BREF psychological domain (dependent variable) showed a significant model summary: F (5, 407) = 27.048, p<.001, which indicated that the 7 factors understudy (urinary incontinence, education level, osteoporosis, hearing impairment and ADL) had a significant impact on how participants rated their health. Moreover, the adjusted R^2=.240 depicted that the model explains 24.0% of variance in how participants rated their QOL. Additionally, coefficients were further assessed to ascertain the influence of each of the factors on WHOQOL-BREF psychological domain variable. For instance, the results revealed that urinary incontinence, osteoporosis, and hearing impairment had a significant and negative impact on WHOQOL-BREF psychological domain score (β=-.284, t=-6.349, p=<.001, β=-.211, t=-4.916, p=<.001, and β=-.196, t=-4.506, p=<.001, respectively). While education level and ADL had a significant and positive impact on WHOQOL-BREF psychological domain score (β=.200, t= 4.476, p=<.001, and β=.141, t=3.237, p=.001, respectively). Hence, H3-b was supported. The results of the VIF showed moderate correlation of variables in the dataset as VIF were between 1.003 and 1.087.

The analysis of the WHOQOL-BREF social domain (dependent variable) showed a significant model summary: F (7, 405) = 16.939, p<.001, which indicated that the 7 factors understudy (urinary incontinence, osteoporosis, fall, frailty, hearing impairment, and visual impairment) had a significant impact on WHOQOL-BREF social domain score. Moreover, the adjusted R^2=.184 depicted that the model explains 18.4% of variance in how participants rated their QOL. Additionally, coefficients were further assessed to ascertain the influence of each of the factors on WHOQOL-BREF social domain variable. For instance, the results revealed that urinary incontinence, osteoporosis, mood disorder/ depression, and frailty had a significant and negative impact on WHOQOL-BREF social domain score (β=-.312, t=-6.458, p=<.001, β=-.137, t=-2.934, p=.004, β=-.124, t=-2.553, p=.011, and β=-.170, t=-3136, p=.002, respectively). However, fall, hearing and visual impairments had a significant and positive impact on WHOQOL-BREF social domain score (β=.207, t=3.934, p=<.001, β=.122, t=2.697, p=.007, and β=.100, t=2.236, p=.026, respectively). Hence, H3-c was supported. The results of the VIF showed moderate correlation of variables in the dataset as VIF were between 1.016 and 1.489.

The analysis of the WHOQOL-BREF environmental domain (dependent variable) showed a significant model summary: F (6, 406) = 27.665, p<.001, which indicated that the 6 factors understudy (frailty, living arrangement, osteoporosis, hearing impairment, mood disorder/ depression, and cognitive impairment) had a significant impact on WHOQOL-BREF environmental domain score. Moreover, the adjusted R^2=.280 depicted that the model explains 28.0% of variance in how participants rated the WHOQOL-BREF environmental domain. Additionally, coefficients were further assessed to ascertain the influence of each of the factors on WHOQOL-BREF environmental domain variable. For instance, the results revealed that frailty, osteoporosis, hearing impairment, and mood disorder/ depression had a significant and negative impact on WHOQOL-BREF environmental domain score (β=-.147, t=-3.129, p=.002, β=-.287, t=-6.437, p=<.001, β=-.167, t=-3.932, p=<.001, and β=-.184, t=-4.094, p=<.001, respectively). Hence, H3-d was supported. The results of the VIF showed moderate correlation of variables in the dataset as VIF were between 1.034 and 1.256.

Discussions

This study investigated the relationship between sociodemographic characteristics, geriatric syndromes, and QOL in older adults living in Botswana's Central Mahalapye subdistrict.

Except for the physical domain of the WHOQOL-BREF, senior participants in this study reported a high quality of life, as most average scores across multiple domains of the WHOQOL-BREF exceeded 50%. In their study of senior citizens residing in the Košice region of Slovakia, Soósová et al. [19] reported nearly identical results, with the exception of a WHOQOL-BREF physical domain score that was slightly above 50%. Doležalová et al. [9] did research in the South Bohemian Region of the Czech Republic and found that the WHOQOL-BREF physical and psychological domains got lower scores than other domains. These were shown by their scores of 11.67 (58.35%) and 12.69 (63.45%), respectively.

The multivariate linear regression found a positive impact between the age group and the self-perceived QOL. Self-perception of ageing is a significant psychosocial determinant that can impact the QOL in the later stages of life [20]. Nevertheless, substantial inconsistencies emerge when examining the findings of various studies pertaining to demographics and QOL [19, 21–23]. Mhaka-Mutepfa et al. reported that age was not associated with QOL in their study conducted in Botswana, Indonesian, and the Zimbabwe studies [21–23]. In a study conducted in Minas Gerais, Brazil, Boliva et al. found that QOL scores varied based on living arrangements, even after accounting for potential confounding variables such as age, gender, number of morbidities, and social support. Older adults living alone had a lower QOL score in the intimacy facet compared to those living with their spouse ($p=0.013$) [24]. This study did not look at the influence of another member of the household when the older adult did not live with a partner. The majority of the older adults in Botswana lives with someone as letting an older adult lives alone is culturally considered as a curse for the family members [25].

In this study, geriatric syndromes such as frailty, nutrition risk to malnutrition, hearing impairment, urinary incontinence, disorder/depression, and osteoporosis had a negative impact on the older adults' self-perception of QOL. This finding is consistent with report from Kojima et al. who found, in a meta-analysis, that frailty had a negative impact on the older adults' self-perception of QOL [4].

Although Damião et al. used a different tool (mini nutritional assessment tool) to assess the nutritional risk among older adults in southeastern Brazil, the team had similar findings to the current study as a negative impact on older adults with nutritional risk scored low on self-perceived QOL [26]. Similar findings about negative impact on hearing impairment, urinary incontinence, mood disorder/depression and osteoporosis were reported by Ciorba et al., Fouad et al., Motsamai et al, and Madureira et al. respectively [28–30]. Presbycusis is associated with reduced QOL and depression. According to the WHO, it is a major contributor to the number of years lived with disability during adulthood [30].

The current study revealed that gender (male) and living arrangement with partner had a significant and positive impact on older adults' self-perceived health. In African culture, male complains less about their health, as there is a believe that male is a strong gender and men engage in restrictive emotionality [31]. One of the most pervasive psychosocial constructs found to be associated with adult health is social support, specifically partner support [32].

The current study revealed that frailty, fall, osteoporosis, urinary incontinence, age group, and mood disorder/depression had a significant and negative impact on older adults' self-perceived health. Frailty not only impact negatively to older adults' self-perceived health [33], it also affects their health seeking behaviour as they have tendency to arrive late to health facilities [34]. Osteoporosis is a contributing factor to the development of chronic pain among the older adults; such pain may be associated with self-perceived health,

diminished social integration, compromised physical activity, reliance on others to perform daily tasks, and a diminished QOL [35]. In a study conducted by Kessler et al. [36], a significant correlation was observed between urinary incontinence and a negative self-perceived health outcome over a period of nine years. If sociodemographic factor such as age group have shown inconsistent relationships with QOL [19, 21–23], one could explain that as the age advances, older adults tend to get more sicker with multiple co-morbidities, as the result, they may negatively self-perceive their health. Motsamai et al. [27] in their previous study in Botswana also reported a negative impact of depression on self-perceived health.

In the current study, the results revealed that frailty, hearing impairment, fall (p=<.001), ADL, nutrition risk, and age group had a significant and negative impact on WHOQOL-BREF physical domain score. According to a meta-analysis performed by Kojima et al., frailty was associated with a significantly diminished physical QOL (−12.7) [4]. Kumar S et al. reported similar findings to the current study as older adults with hearing impairment had tendency to score low the WHOQOL-BREF physical domain [3]. Also, in a study involving 30 individuals with hearing loss, all of whom were over the age of 60 and patients of a speech therapy clinic in Brazil, Mondelli et al. found that hearing impairment negatively affected the majority of WHOQOL-BREF domains, including the physical domain [37]. To prevent further falls and subsequent low scores on the WHOQOL-BREF physical domain, older adults who have experienced a fall within the previous year may opt to decrease their level of mobility. Datta et al. discovered, in a community-based cross-sectional study conducted in West Bengal, India, that older adults with dependent ADL impairment had low WHOQOL-BREF scores, which is consistent with our findings [38]. Comparable to our findings, Damião et al. and Costa et al. reported a statistically significant difference between the nutrition risk and age group on the physical domain of the WHOQOL-BREF [26, 39]. In their community-based homecare study conducted in Crete, Greece, Tasioudi et al. excluded participants who had severe dementia, hearing impairments, visual or hearing impairments, or post-stroke implications. The investigators discovered that ADL negatively impacted the physical domain of the WHOQOL-BREF, this result was like the current study [8].

In this study, education level and ADL had a significant and positive impact on WHOQOL-BREF psychological domain score. However, urinary incontinence, osteoporosis (p=<.001), and hearing impairment had a significant and negative impact on WHOQOL-BREF psychological domain score. This is in keeping with the findings from Tasioudi et al. who reported a positive impact of education level on WHOQOL-BREF psychological domain score (p=0.028), and a negative impact of frailty, and pression to the psychological domain. However, contrary to the findings from the current study, the cognitive impairment had a negative impact to the psychological domain [8]. Further investigations are required to explain current study findings of ADL positively impacting the psychological domain that was contrary to Datta et al. and Tasioudi et al. findings [8,38]. Urinary incontinence has serious impact on self-esteem of older adults as it brings shame [36]. This could explain why older adults in the current study scored low in the psychological domain. Osteoporosis is a devastating condition that can result in long-lasting pain and significant disability, which in turn can contribute to diminished self-esteem and negative perceptions of life's purpose. Consequently, this condition has adverse effects on the psychological domain. Kumar S et al. [3] reported dissimilar findings to the current study as older adults with hearing impairment did not impact on the WHOQOL-BREF psychological domain as p-value was >.05.

In this study, fall, hearing impairment, and visual impairment had a significant and positive impact on WHOQOL-BREF social domain score. While urinary incontinence (p=<.001), osteoporosis, mood disorder/ depression, and frailty had a significant negative impact on WHOQOL-BREF social domain score. If further investigations are needed to find reasons of results from this study such as falls hearing impairment in WHOQOL-BREF social domain score, one could explain that older adults who had fall, hearing and visual impairment attract more support from their family members and community as it is required by the local culture [25]. In their study, Tasioudi et al. identified the detrimental effects of depression and frailty on the social domain of the WHOQOL-BREF. These conditions impair the functional capacity of older individuals, disrupt the balance between social participation, and hinder interactions with others [40]. As a cause of chronic pain, osteoporosis can impede social interaction, whereas urinary incontinence is associated with embarrassment. These factors could potentially account for diminished social interaction and the subsequent low WHOQOL-BREF social domain score.

In this study, frailty, osteoporosis, hearing impairment, and mood disorder/ depression had a significant and negative impact on WHOQOL-BREF environmental domain score. Frailty and depression are GS that negatively impact most of the WHOQOL-BREF domains [4, 40]. As osteoporosis may cause severe disability and premature death from fracture as typically fractures are in spine, proximal femur distal forearm and proximal humerus. Fractures in the spine, proximal femur, distal forearm, and proximal humerus are common, and osteoporosis can result in death or severe disability due to these risks. A mere 30–40% of fractures manifest at the time of occurrence [41]; the remaining 65–75% are asymptomatic or cause only mild symptoms. As a result, the WHOQOL-BREF environmental domain may be adversely affected, including the activities and community participation of older adults.

This study may be limited by the BAT for CGA instrument that was used to assess geriatric syndromes [5]; the instrument has yet to be validated in a rural African environment. The potential consequence of misclassifying geriatric syndromes is the difficulty of accurately evaluating their effect on quality of life. Therefore, we need to conduct further study to validate the BAT for CGA tool in rural African environments.

Conclusion

This study examined the relationship between sociodemographic factors, geriatric syndromes, and QOL among elderly individuals residing in the Central Mahalapye subdistrict of Botswana. Except for the physical domain of the WHOQOL-BREF, senior participants in this study reported a high QOL, as most average scores across multiple domains of the WHOQOL-BREF exceeded 50%. Frailty and osteoporosis negatively impacted most WHOQOL-BREF domains, but education level and living arrangement (with partner) improved some. This suggests that screening for frailty and osteoporosis is crucial for enhancing QOL. We recommend further study to validate the BAT for CGA tool in rural African environments as misclassification of geriatric syndromes may impact on the results of relationship between QOL and geriatric syndromes.

Conflict of Interest

There was no conflict of interest. This study was funded by authors.

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